in CO_2, below it is insoluble. In terms of fluid density, the CO_2 conditions for achieving an integrated positive resist system is as follows:

Depositing Density > ρ_1
ρ_2 < Development Density < ρ_1
Removal (e.g., Strip) Density > ρ_1

In embodiments encompassing either the negative-tone or positive-tone resists, it is possible to incorporate a refractory element such as, for example, silicon, to enable dry pattern transfer steps like O_2-RIE particularly in the form of microphase separated morphologies that are capable of elevating the glass transition temperature (T_g) of the continuous phase (see e.g., DeSimone et. al. *Macromolecules* **1991**, 24 5330-5339).

Any of the carbon dioxide-containing compositions may also include additional components, the selection of which is known to one skilled in the art. Exemplary components include, without limitation, aqueous and organic co-solvents, polymer modifiers, water, rheology modifiers, plasticizing agents, flame retardants, antibacterial agents, flame retardants, and viscosity reduction modifiers.

In another aspect, the invention provides a process of making integrated circuits. The process comprises the steps of:

(a) inserting at least one wafer into an integrated microelectronics process device (IMPD); then

(b) contacting the at least one wafer with a first composition comprising carbon dioxide and a polymeric material to deposit the polymeric material on the substrate and form a coating thereon; then

(c) imagewise exposing the coating to radiation such that exposed and unexposed coating portions are formed; then

(d) subjecting the coating to a second composition comprising carbon dioxide such that either one of the exposed or the unexposed coating portions are removed from the at least one and the other coating portion remains on the coating to form an image thereon (i.e, developing the image with carbon dioxide); then

(e) depositing a metal-containing material or an ionic material on the surface of the wafer from which the exposed or the unexposed coating portions were removed; then

(f) removing the exposed or unexposed coating portion from the wafer; and then

(g) removing the at least one wafer from the IMPD.

Advantageously, steps (a) through (f) are all performed repeatedly in the IMPD without the wafer being removed from the IMPD. In a preferred embodiment (b) through (f) are repeated at least once without removing the at least one wafer from the IMPD. One example of an IMPD that can be employed is described in U.S. Patent No. 6,045,877 to Gleason et al., the disclosure of which is incorporated herein by reference in its entirety.

In another aspect, the invention encompasses a process of making integrated circuits. The process comprises the steps of:

(a) inserting at least one wafer into an integrated microelectronics process device (IMPD); then

(b) contacting the at least one wafer with a first composition and a component selected from the group consisting of at least one polymeric material, at least one polymeric precursor, and at least one monomer, and mixtures thereof to deposit the component on the wafer and form a coating thereon; then

(c) imagewise exposing the coating to radiation such that exposed and unexposed coating portions are formed; then

(d) subjecting the coating to a second composition comprising carbon dioxide such that either one of the exposed or the unexposed coating portions are removed from the at least one and the other coating portion remains on the coating to form an image thereon (i.e., developing the image with carbon dioxide); then

(e) depositing a metal-containing material or an ionic material on the surface of the wafer from which the exposed or the unexposed coating portions are removed; then

(f) removing the exposed or unexposed coating portion from the wafer; and then

(g) removing the at least one wafer from the IMPD;

wherein said steps (a) through (f) are performed in the IMPD without the at least one wafer being removed from the IMPD.

In another aspect, the invention encompasses a process of making integrated circuits. The process comprises the steps of:

(a) contacting at least one wafer with a first composition and a component selected from the group consisting of at least one polymeric material, at least one polymeric precursor, and at least one monomer, and mixtures thereof to deposit the component on the wafer and form a coating thereon; then

(b) imagewise exposing the coating to radiation such that exposed and unexposed coating portions are formed; then

(c) subjecting the coating to a second composition comprising carbon dioxide such that either one of the exposed or the unexposed coating portions are removed from the at least one and the other coating portion remains on the coating to form an image thereon (i.e., developing the image with carbon dioxide); then

(d) depositing a metal-containing material or an ionic material on the surface of the wafer from which the exposed or the unexposed coating portions are removed; and then

(e) removing the exposed or unexposed coating portion from the wafer.

wherein said steps (a) through (e) are performed in the IMPD without the at least one wafer being removed from an IMPD. In a preferred embodiment (a) through (e) are repeated at least once without removing the at least one wafer from an IMPD. In another preferred embodiment, a selective etching step such as those described herein may be employed subsequent to step (c) but prior to step (d) to selectively remove various materials that may be present on the substrate including, without limitation, those described herein.